SECTION 2

Miscellaneous Data

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2.1 BOLT TORQUE SPECIFICATIONS (GENERAL GUIDE FOR INCH FASTENERS)

Use the “Standard Torque” charts as a general guide when tightening fasteners that DO NOT HAVE SPECIFIC TIGHTENING RECOMMENDATIONS.

Inch Fastners Standard torque in Newton Metres (Foot pounds)					
*Inch bolt size	SAE grade 5 ** mild steel below grade 5	SAE grade 8 ISO grade 8.8 BS grade S		ISO grade 10.9 BS grade V	
		*** Non-rigid joint	**** Rigid joint	*** Non-rigid joint	**** Rigid joint
1/4 inch	6 - 8 (4 - 6)	9 - 12 (7 - 9)	11 - 15 (8 - 11)	13 - 18 (10 - 13)	16 - 22 (12 - 16)
5/16 inch	12 - 16 (9 - 12)	18 - 24 (13 - 18)	22 - 30 (16 - 22)	25 - 34 (18 - 25)	31 - 43 (23 - 32)
3/8 inch	22 - 30 (16 - 22)	31 - 42 (23 - 31)	39 - 53 (29 - 39)	44 - 60 (32 - 44)	55 - 75 (41 - 55)
7/16 inch	35 - 47 (26 - 35)	51 - 69 (38 - 51)	64 - 86 (47 - 63)	72 - 96 (53 - 71)	90 - 120 (66 - 89)
1/2 inch	54 - 72 (40 - 53)	80 - 104 (59 -77)	100 - 130 (74 - 96)	110 - 140 (81 - 103)	140 - 180 (103 - 133)
5/8 inch	110 - 140 (81 - 103)	160 - 210 (118 - 155)	200 - 260 (148 - 192)	220 - 300 (162 - 221)	280 - 370 (207 - 273)
3/4 inch	190 - 250 (140 - 184)	280 - 370 (207 - 273)	350 - 460 (258 - 339)	390 - 530 (287 - 391)	490 - 660 (361 - 487)
7/8 inch	310 - 410 228 - 302	450 - 610 (332 - 450)	560 - 760 (413 - 561)	640 - 850 (472 - 672)	800 - 1060 (590 -782)
1 inch	460 - 620 (339 - 457)	670 - 900 (494 - 664)	840 - 1120 (620 - 826)	960 - 1280 (708 - 944)	1200 - 1600 (885 - 1180)

Key to table above:

* *NOTE: The size is the diameter of the shank - not the head width.*

** *NOTE: Mild steel torque values to be used for SAE Grade 5 bolts when weld nuts, or other low strength nuts are used.*

*** *NOTE: Use these values when any of the following conditions exist:*

1. Possible damage to the joined members of the assembly may occur.
2. Thick and/or highly compressible gaskets are used between members.
3. Non -flat unmachined seating surfaces for bolt head (or nut) occurs.
4. Non -flat or non -parallel joint faces are encountered.

**** *NOTE: Use these values when ALL of the following conditions exist:*

1. Damage will not occur to the joined members of the assembly.
2. It is desirable to use this higher clamping force to ensure tightness.
3. Fastener thread is not lubricated prior to assembly.

2.2 BOLT TORQUE SPECIFICATIONS (GENERAL GUIDE FOR METRIC FASTENERS)

Use the "Standard Torque" charts as a general guide when tightening fasteners that DO NOT HAVE SPECIFIC TIGHTENING RECOMMENDATIONS

Inch Fastners Standard torque in Newton Metres (Foot pounds)					
*Inch bolt size	SAE grade 5 ** mild steel below grade 5	SAE grade 8 ISO grade 8.8 BS grade S		ISO grade 10.9 BS grade V	
		*** Non-rigid joint	**** Rigid joint	*** Non-rigid joint	**** Rigid joint
M6	4 - 5 (3 - 4)	8 - 11 (6 - 8)	10 - 14 (7 - 10)	12 - 16 (9 - 12)	14 - 20 (10 -15)
M8	10 - 13 (7 - 10)	20 - 28 (15 - 21)	25 - 35 (18 - 26)	29 - 37 (21 - 27)	36 - 46 (27 - 34)
M10	19 - 25 (14 -18)	40 - 56 (30 - 41)	50 - 70 (37 - 52)	57 - 77 (42 - 57)	72 - 96 (53 -71)
M12	33 - 43 (24 - 32)	72 - 96 (53 - 71)	90 - 120 (66 - 89)	100 - 130 (74 - 96)	120 - 160 (89 - 118)
M16	84 - 110 (62 - 81)	160 - 210 (118 - 155)	200 - 260 (148 - 192)	240 - 320 (177 - 236)	300 - 400 (221 - 295)
M20	160 - 210 (118 - 115)	340 - 450 (251 - 332)	420 - 560 (310 - 413)	480 - 640 (354 - 472)	600 - 800 (443 - 590)

Key to table above:

* *NOTE: The size is the diameter of the shank - not the head width.*

** *NOTE: Mild steel torque values to be used for SAE Grade 5 bolts when weld nuts, or other low strength nuts are used.*

*** *NOTE: Use these values when any of the following conditions exist:*

1. Possible damage to the joined members of the assembly may occur.
2. Thick and/or highly compressible gaskets are used between members.
3. Non -flat unmachined seating surfaces for bolt head (or nut) occurs.
4. Non -flat or non -parallel joint faces are encountered.

**** *NOTE: Use these values when ALL of the following conditions exist:*

1. Damage will not occur to the joined members of the assembly.
2. It is desirable to use this higher clamping force to ensure tightness.
3. Fastener thread is not lubricated prior to assembly.

2.3 CONVERSION TABLES

Area	Multiply by
mm^2 to in^2	0.0015
in^2 to mm^2	645.16
m^2 to ft^2	10.764
ft^2 to m^2	0.0929
ha to acre	2.4711
acre to ha	0.4047

Capacity	Multiply by
ml to fluid oz	0.0351
fluid oz to ml	28.413
litre to gal	0.2200
gal to litre	4.5640
litre to US gal	0.2640
US gal to litre	3.7850
gal to US gal	1.2010
US gal to gal	0.8330

Length	Multiply by
mm to in	0.0394
in to mm	25.400
m to ft	3.2808
ft to m	0.3048
km to mile	0.6214
mile to km	1.6093
tonne to ton	0.9842
ton to tonne	1.0160

Power	Multiply by
ps to hp	0.9863
hp to ps	1.0139
kW to hp	1.3410
hp to kW	0.7457

Pressure	Multiply by
bar to lbf/in^2	14.504
lbf/in^2 to bar	0.0690

Speed	Multiply by
km/hr to mile/hr	0.6214
mile/hr to km/hr	1.6093

Torque	Multiply by
Nm to lbf ft	0.738
lbf ft to Nm	1.356

Volume	Multiply by
mm^3 to in^3	0.6102
in^3 to mm^3	163.87
m^3 to ft^3	35.315
ft^3 to m^3	0.0283

Weight	Multiply by
gram to oz	0.3530
oz to gram	28.350
kg to lb	2.2046
lb to kg	0.4536
kg to ton	0.0010
ton to kg	1016.1

Temperature
ºC to ºF 1.8 x ºC + 32
ºF to ºC (ºF - 32) ÷ 1.8

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